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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,805	02/09/2004	Hong Jiang	81075405	9249

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EXAMINER	
PIPALA, EDWARD J	

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/774,805	JIANG ET AL.	
	Examiner	Art Unit	
	Edward Pipala	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 17-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 17-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office action is in response to Applicant's amendment and remarks filed June 7th of 2006. Claims 1-9 and 17-19 are pending, claims 10-16 and 20-32 having been withdrawn from consideration.

The previous rejection under 35 USC 112, second paragraph, of claim 2 is withdrawn in accordance Applicant's amendment to claim 2.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 17-19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Maguire et al (6, 095,946).

Independent claim 1 recites a method for controlling a clutch that driveably connects an input and an output comprising the steps of producing input torque at the clutch, operating the clutch partially engaged, calculating the temperature of the clutch, establishing a reference clutch temperature, comparing the calculated and the reference temperatures, and subsequently increasing the degree of clutch engagement to reduce the calculated temperature of the clutch.

As shown in figure 1, Maguire et al. discloses a temperature rise control method for a clutch (18), placed between an engine (12, which produces and input torque) and a differential (16). Figure 4 of Maguire et al. discloses calculating the temperature of the clutch. Where col. 3, lines 12-21 particularly teaches that relative slippage between adjacent discs transmits energy to the clutch system which raises its temperature, and that the clutch disc structure(s) is cooled by fluid flow when "completely engaged" or disengaged (lines 12-16). It goes on to say that this slipping during the engagement cycle of the friction (clutch) device produces heat which is then transferred from the steel discs to the hydraulic fluid and surrounding metal components. This aspect of "calculating the temperature of the clutch" is depicted graphically in figure 4, along with a design (reference) temperature limit (26), as well as also disclosing the control of the degree of clutch engagement sufficient to reduce the temperature of the clutch (30) below the reference limit (26).

With respect to claims 17-19, where claim 17 further recites "means for producing an output signal" for increasing the degree of clutch engagement sufficiently to reduce the calculated temperature of the clutch, please see previously noted section of col. 3, ll. 12-21, as well as lines 43-62 of col. 3 which disclose the use of an electro-hydraulic control unit (22) for controlling solenoid valves along with the engagement and disengagement of friction mechanisms of the clutch (18) by further controlling the engagement time, rate of pressure change in the friction device engagement "and the maximum engagement pressure in the friction devices". This aspect is further reinforced by the section including lines 35-44 wherein Maguire et al., teaches that if it is determined that the calculated clutch temperature may exceed the clutch reference/limit

temperature then "[t]he shift will generally be made with lower engine torque and increased apply pressure at the friction device".

With respect to dependent claims 18 and 19, which recite fully engaging the clutch and the use of a servo and solenoid for engaging and disengaging the clutch, please see the lower portion of column 3, lines 43-62, noted above as relating to solenoid engagement of the clutch friction mechanisms.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-9 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salecker et al. (USPN 6,006,149) in view of Maguire et al. (USPN 6,095,946).

Salecker et al. discloses an actuating apparatus for a torque transmitting system (clutch), in which the temperature thereof is calculated or determined using an iterative process in which the temperature of the clutch is determined as a function of time from

one instant *t*, to the next instant $t + \Delta t$ (col. 2, ll. 34-40). Column 5 line 63 through col. 6, l. 11 of Salecker et al. discloses that the torque transmitting system (103) comprises an input side (107) and an output side (108), and that if there exists a difference in the RPM (speed) between the input side and the output side then there develops an energy input which is converted into friction heat, entailing a temperature rise. Additionally, col. 9, ll. 25-35 disclose preventing excessive slip in a torque transmitting system by means of control unit (113) which can ascertain, calculate and/or determine whether or not increased (excessive) slip exists and then proceeds to initiate or carry out undertakings which are to prevent an excessive stressing and/or destruction of the torque transmitting system (clutch). While Salecker et al. does teach preventing excessive stressing or destruction of the torque transmitting system, it does not particularly teach "increasing the degree of clutch engagement sufficiently to reduce the calculated temperature of the clutch" when a calculated clutch temperature equals or exceeds the reference clutch temperature.

Maguire et al. teaches a method of temperature rise control for a disc type friction torque transmitting system in which column 3, ll. 12-21 particularly teach completely engaging or completely disengaging the clutch discs to avoid additional heating of the clutch system, where col. 4, ll. 23-29 further disclose that this transmission control is accomplished by keeping track of the temperature increase and mitigating any additional heating when the clutch temperature reaches or exceeds the desired clutch temperature limit as shown in figure 4.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have implemented the clutch temperature threshold limit control as taught by Maguire et al., within the context of the clutch temperature monitoring

system of Salecker et al., because both are directed to monitoring clutch temperature as it relates to transmission of torque through a slipping clutch arrangement, in which both Maguire et al. and Salecker et al. act to prevent excessive heat related stressing of the torque transmitting system by limiting or eliminating clutch slip when temperatures warrant so as to preserve the safe operation of the clutch at a reduced temperature.

With respect to claims 2 and 3, which relate to determining current clutch slip and determining first and second clutch torque magnitudes, please see col. 8, ll. 49-67 and col. 9, ll. 25-35 of Salecker et al., which teaches clutch slip adjustment for torque transmission while limiting excessive clutch slip, and wherein it would have been obvious to one of ordinary skill in the art of clutch control that clutch slip is eliminated when the clutch is fully engaged.

With respect to claim 4, which relates to repetitively calculating the temperature of the clutch and maintaining a running total of the change of clutch temperature over each interval, please see Figure 4 of Maguire et al., as well as col. 2, ll. 34-40 and column 3 of Salecker et al.

With respect to claim 5, which relates to repetitively calculating the clutch temperature as well as calculating a differential change in transmitted power over the successive intervals, determining the thermal mass of the clutch, etc., please see col. 3, ll. 9-44, wherein Salecker et al. discloses the temperature increase attendant greater clutch clip and torque transfer as it relates to the heat or thermal/heat capacity/mass of the clutch components.

With respect to claim 6, which relates to repetitively determining the magnitude of power transmitted to the clutch input and the magnitude of power transmitted from the clutch output, over successive intervals, please see figures 2 and 3 of Maguire et al.

With respect to claims 7 and 8, which relate to determining clutch gain, repetitively determining the magnitude of the clutch pressure at successive intervals, determining the average coefficient of friction for friction disc-spacer sets, determining the number of pairs of sets, determining the effective friction area, etc., please see figure 2 (and in particular #46) of Maguire et al., as well as col. 1, ll. 14-33 and col. 3.

With respect to claim 9, which relates to fully engaging the clutch if the clutch threshold temperature greater than the reference temp of claim 1, it would have been obvious to one of ordinary skill in the art at the time the invention was made to fully engage the clutch if it had been, or once it has been determined that, the clutch temperature is higher than a reference or limit value, in order to bring down the clutch temperature by eliminating the relative slip between the clutch surfaces.

Response to Arguments

4. Applicant's remarks and arguments center for the most part on attacking the examiner's exact citations of passages of the '946 patent of Maguire et al., with respect to certain claimed portions of subject matter, and then again using these same perceived shortcomings of Maguire et al. to discredit the rejection of claims 1-9 and 17-19 under 35 U.S.C. 103 as being obvious in view of Salecker et al., and Maguire et al.

In this respect Applicant cites the section of Maguire et al. ('946), noted by the Examiner as column. 3, lines 12-21, and then suggests that "[t]he cited text is entirely silent with respect to changing the degree of clutch engagement". The fact of the matter is that Applicant seemed to choose to disregard the fact the this exact portion of the '946 reference explicitly teaches that relative slippage of the clutch discs causes an increase in clutch temperature during engagement, and that in response thereto the structures (e.g., the clutch discs) are cooled by fluid flow *when completely engaged or disengaged* (indicating a changed degree of clutch engagement from the partially engaged/slipping mode of engagement).

Applicant then suggests that column 4, lines 3-29 of Maguire et al. ('946) is also "entirely silent with respect to changing the degree of clutch engagement". While that may be true, the above cited portion of column 4 certainly teaches the use of a temperature calculating algorithm for use with the clutch friction device so as to keep the expected rise in temperature below design limits (col. 4, ll. 30-35), where lines 43-44 particularly and specifically teach or disclose increasing the pressure applied to the friction device (clutch). Likewise, the lower portion of col. 3 (ll. 44-62) disclose the electro-hydraulic controller (22) and use of solenoid valves for engagement and disengagement of the friction mechanisms including the clutch (18), as well as the fact that the CPU controls not only the engine output but also the engagement time of the friction devices, the rate of pressure change in the friction devices during engagement and the *maximum engagement pressure* in the friction devices.

With respect to the rejection under 35 U.S.C. 103 as being unpatentable over Salecker et al. ('149) in view of Maguire et al. ('946), Applicant merely relies on the previous arguments with respect to Maguire et al., noted above, and suggests that once again the '946 patent is silent with respect to increasing the degree of clutch engagement to avoid an overheated clutch. This sustained argument with respect to Maguire et al., has been addressed at length above with respect to columns 3 and 4 thereof.

Conclusion

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Edward Pipala whose telephone number is 571-272-1360. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ejp

JACK KEITH
SUPERVISORY PATENT EXAMINER